

18. (withdrawn): The reactor of claim 17 wherein a substrate is mounted in said second container proximate said outlet for deposit of said MN thereon.

19. (withdrawn): The reactor of claim 17 wherein said first and second containers are elongated.

REMARKS

Claims 1-14 are in the present application. Claim 1 has been amended to recite "flowing" iodine vapor into heated metal to form MI and "flowing" MI into contact with ammonia to form MN, as recited for example, in original claim 9 hereof and no new matter has been added.

The Office Action rejection of claims 1-8 & 13, 14 as obvious under 35 USC 103 (a) over Vaudo et al ('581) in view of Hirota et al ('299 A 2), is respectfully traversed.

As noted previously, Vaudo et al teach passing HCl over high purity gallium to form GaCl, which is later reacted with ammonia to form GaN. However, Vaudo et al, as noted by the Office Action, does not teach contacting a heated metal with iodine vapor, let alone, with flowing iodine vapor.

The Office Action then cites Hirota et al which teaches employing iodine as a halogen molecule instead of HCl and states it would have been obvious to so modify Vaudo et al in view of the Hirota reference.

However, Hirota et al teaches a closed system (and not a flow-through system) with only nitrogen being added to the system periodically as it is depleted. Any impurities that are initially in the system with the halogen or metal (e.g., gallium, aluminum or indium) will be continuously recycled until they are trapped in the growing nitride film.

Thus the Hirota reference also does not teach contacting a heated metal with flowing iodine vapor.

However, the process of applicants' claim 1 teaches iodine that vaporizes and flows into contact with heated metal vapor, to form MI and flows on (to contact ammonia and form MN), leaving impurities behind.

Thus the Hirota et al closed system does not suggest a combination with a

(Vaudo et al) flowing iodine system unless one has in view applicants' own disclosure. This is hindsight reconstruction, which does not establish obviousness, In re Civitello, 144 USPQ 10.

Further, the Vaudo process has a problem in its use of HCl, which is toxic and corrosive. That is, HCl can corrode even steel flow lines and valves. Yet despite this problem, it apparently did not occur to Vaudo et al to convert to an iodine system, which is non corrosive, despite their skill in the art.

Also, claims 2-8 and 13, 14, are believed distinguished over the above applied references in view of their dependence from claim 1, which is believed novel thereover, as discussed above.

The Office Action rejection of claims 9-12 as obvious under 35 USC 103 a) over Vaudo et al ('581), in view of Hirota et al ('299 A2) and further in view of Jain ('163), is respectfully traversed.

Applicants claims 9-12 are believed distinguished over the above the first two references in view of their ultimate dependence from claim 1, as amended, which is believed novel thereover as discussed above. As to the Jain reference, it discloses, not a method for forming metal nitrides from iodine, a two step process, but a one step process wherein a gaseous stream of iodine is flowed through a wad of quartz wool containing silicon particles and deposits silicon layers on a substrate. That is, silicon is carried by iodine from point A to point B, still as silicon and not a different compound such as metal nitride. Further, the wad containing crushed silicon can cause a buildup of impurities which can flow onto the substrate.

Now looking the three references in combination, note that claims 9-12 define a two-boat (in series) process whereas the cited references each disclose a one-boat (in series) process. With a two-boat process, one can control the temperature of the Iodine boat and thus its vapor pressure and one can control the temperature of the metal boat and the metal pick-up rate. This means the growth rate, thickness and quality of the MN product can be controlled in a fine tuning process not achievable in a one-boat process.

In view of the foregoing, the claims of record, as amended, are believed distinguished over the applied art and in condition for allowance.

In accordance with Section 714.01 of the M.P.E.P., the following information is presented in the event that a call may be deemed desirable by the Examiner: Thomas C. Stover, (781) 377-3779.

Respectfully submitted,



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